KARAN TANEJA

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EDUCATION

University of California, San Diego, USA
Ph.D., Department of Structural Engineering   2018 - 2023

Micro-MBA, Rady School of Management   June - August 2022

TU Delft, Delft, The Netherlands
M.Sc., Structural Engineering   2015-17

Delhi Technological University, New Delhi, India
B.Tech., Civil Engineering   2009-13

RESEARCH INTERESTS

Computational Biomechanics, Physics-Informed Machine Learning.

WORK EXPERIENCE

University of Notre Dame, South Bend, USA   *November 2023 - Present*
Postdoctoral Research Associate

HP Inc., Palo Alto, USA   *June-October 2023*
Ph.D. Intern

MIDAS IT, Mumbai, India and Seongnam-Si, South Korea   *June 2013 - September 2014*
Technical Support Engineer

PUBLICATIONS

Taneja, K., He, X., Chen, J. S., Hodgson, J., Sinha, U., Sinha, S. (2024), *Investigating the Correlation between Force Generation and Intra-Muscular Pressure for Active Skeletal Muscle Contractions.* arXiv(Preprint).

Taneja, K., He, X., He , Q., Chen, J. S. (2023), *A Multi-Resolution Physics-Informed Machine Learning Approach for Musculo-skeletal Digital Twin Applications.* Computational Mechanics.

Taneja, K., He, X., He , Q., Zhao, X., Lin, YA, Loh, K., Chen, J. S. (2022), *A Feature-Encoded Physics-Informed Parameter Identification Neural Network for Musculo-Skeletal Systems.* Journal of Biomechanical Engineering, 144(12), 121006.

He, X., Taneja, K., Chen, J. S., Lee C. H., Hodgson, J., Malis, V., Sinha, U., Sinha, S. (2022), *Multiscale Modeling of Passive Material Influences on Deformation and Force Output of Skeletal Muscles.* International Journal for Numerical Methods in Biomedical Engineering, 38(4), e3571.

Reedlunn, B., Moutsanidis, G., Baek, J., Huang, T. H., Koester, J., He, X., ...Taneja, K., Bazilevs, Y. & Chen, J. S. (2020, June). *Initial Simulations of Empty Room Collapse and Reconsolidation at the Waste Isolation Pilot Plant.* In 54th US Rock Mechanics/Geomechanics Symposium. OnePetro.

Hoogenboom, P. C. J., Chenjie, Y., Taneja, K. (2016), *Moments due to Concentrated Loads on Thin Shell Structures.* Heron, 61(3), 153.

SEMINARS AND PRESENTATIONS

Taneja, K. (2025, March 3-7), *In silico modeling of biological tissues across length scales.* Young Investigators' Meeting, Agra, India.

Taneja, K. (2024, August 23), *Modeling biological tissues across length scales.* Mechanical Engineering Department, IISc Bangalore, India.

Taneja, K. (2024, August 7), *Modeling biological tissues across length scales.* Center for Biomedical Engineering, IIT Delhi, India.

Taneja, K., Holland, M. (2024, June 11-14), *A Numerical Study on the Effect of Cortical Diffusivity on Brain Tissue Gyrification.* Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Lake Geneva, USA.

Taneja, K., He, X., He, Q., Chen, J. S., (2024, January 25), *Feature Encoded and Multi-Resolution Physics-Informed Machine Learning Approaches for Musculo-skeletal Digital Twin Applications.* Physics-informed machine learning meets engineering seminar series, The Alan Turing Institute, Online Link.

Taneja, K., He, X., He, Q., Chen, J. S., (2023, July 25 - July 27), *Feature Encoded and Multi-Resolution Physics-Informed Machine Learning Approaches for Musculo-skeletal Digital Twin Applications.* 17th U.S. National Congress of Computational Mechanics (NCCM), Albuquerque, USA.

Taneja, K., He, X., He, Q., Chen, J. S., (2022, July 31 - August 5), *Physics-Informed Parameter Identification in Digital Twins of Human Musculo-Skeletal systems.* 15th World Conference on Computational Mechanics (WCCM), Yokohoma, Japan.

Taneja, K., He, X., Chen, J. S., (2021, September 26-29), *Physics-Informed System Identification in Digital Twins of Human Musculo-Skeletal systems.* Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology - An IACM Conference (MMLDT-CSET), San Diego, USA.

Taneja, K., He, X., Chen, J. S., (2021, July 25-29). *System Identification in Digital Twins of Human Musculo-Skeletal Systems.* 16th U.S. National Congress of Computational Mechanics (NCCM), Chicago, USA.

Taneja, K., He, X., Chen, J. S., (2021, March 23-25). *System Identification in Digital Twins of Human Musculo-Skeletal Systems.* 5th Annual Workshop on Naval Applications of Machine Learning (NAML), San Diego, USA.

RESEARCH FELLOWSHIPS

Departmental Fellowship
Jacobs School of Engineering, University of California San Diego for the Academic Year 2018-2019

TEACHING EXPERIENCE

Short Course Instructor

- 15th World Conference on Computational Mechanics, July 2022
  Course Title: Machine Learning for Solid Mechanics

Student Mentor, NSF-Research Experience for Undergraduates, UC San Diego

- *Summer 2019*
  Project: Using Image Segmentation techniques to create Computational Models of Calf Muscles.

- *Summer 2020, 2021*
  Project: Using Machine Learning techniques to approximate the Failure Envelopes of Composites.

- *Summer 2022*
  Project: Motion Prediction and Parameter Identification of Human Musculo-Skeletal system using Physics-Informed Machine Learning.

Teaching Assistant, Department of Mechanical and Aerospace Engineering, UC San Diego

- *Winter 2020, 2022, 2023*
  Courses: MAE 232B, Finite Elements in Solid Mechanics II

- *Fall 2020, 2021, 2022*
  Courses: MAE 232A, Finite Elements in Solid Mechanics I

PROGRAMMING AND SOFTWARE SKILLS

- Proficient in scientific Python, MATLAB and ABAQUS.

- Intermediate skills in FEBio, Ansys, TensorFlow, PyTorch, C++ and FORTRAN.

REFERENCES

- J. S. Chen (js-chen@ucsd.edu)
  Professor, Dept. of Structural Engineering,
  University of California, San Diego, USA.

- Maria Holland (maria-holland@nd.edu)
  Associate Professor, College of Engineering,
  University of Notre Dame, Notre Dame, USA.

- Qizhi He (qzhe@umn.edu)
  Assistant Professor, Dept. of Civil, Environmental, and Geo- Engineering,
  University of Minnesota, Twin Cities, USA.

- Shantanu Sinha (shsinha@health.ucsd.edu)
  Professor, Dept. of Radiology,
  University of California, San Diego, USA.